

Tuesday, November 30

Name \_\_\_\_\_

Email \_\_\_\_\_

6.818 Fall 2021

Miniquiz #25

5 Minutes

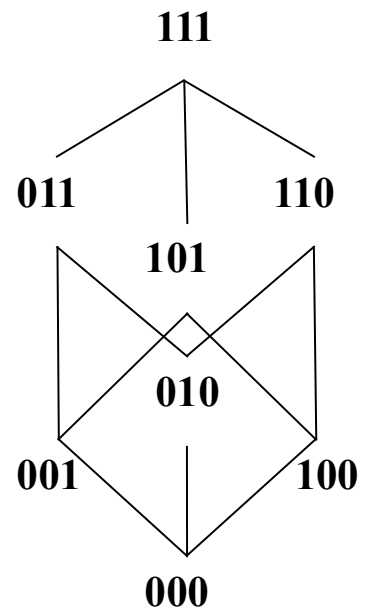
Let set  $P = \{000, 001, 010, 011, 100, 101, 110, 111\}$  and let the partial order  $x \leq y$  be defined as:

$x \leq y$  if  $(x \& y) = x$  where  $\&$  denotes bitwise AND

The figure on the right shows the Hasse diagram of the lattice  $(P, \leq)$ .

1. What is the least upper bound of the set  $\{101, 100, 001\}$ ?

2. What is the greatest lower bound of the set  $\{101, 100, 001\}$ ?



3. Is this a complete lattice? If it is a complete lattice, describe how to compute the least upper bound and greatest lower bound of any subset of P. If it is not a complete lattice, specify a subset of P for which either a least upper bound or a greatest lower bound does not exist.